

**Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554**

In the Matter of)	
)	
Review of the Commission's Rules Governing)	WT Docket No. 17-200
the 896-901/935-940 MHz Band)	

COMMENTS OF THE ASSOCIATION OF AMERICAN RAILROADS

Kathryn D. Kirmayer
Senior Vice President – Law & General Counsel

Timothy J. Strafford
Associate General Counsel

THE ASSOCIATION OF AMERICAN RAILROADS
425 Third Street, SW, Suite 1000
Washington, DC 20024

Michele C. Farquhar
David Martin
Tom Peters
John Castle

HOGAN LOVELLS US LLP
555 Thirteenth Street, NW
Washington, DC 20004

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The Association of American Railroads (“AAR”) submits these comments in response to the Notice of Proposed Rulemaking (“NPRM”) released by the Federal Communications Commission (“Commission” or “FCC”) in the above-captioned proceeding.¹ In the NPRM, the Commission proposes to “realign the 900 MHz band to create a broadband segment and to reserve the remainder . . . for continued narrowband operations.”² AAR, however, currently holds a unique nationwide ribbon license on which its member railroads operate thousands of radios. Clearing these safety-related operations from the proposed broadband segment – especially at the county level – and returning railroads’ operations to site-based licenses would be extraordinarily burdensome and expensive for AAR, prospective broadband licensees, and the Commission.

To avoid the burdens of moving this complex and unusual nationwide system, which could jeopardize the success of the 900 MHz band’s reconfiguration, the Commission should permit AAR and pdvWireless, Inc. (“PDV”), to swap spectrum. The proposed swap would:

- (1) clear the proposed broadband segment of railroads’ nationwide safety applications;
- (2) provide AAR with 10 contiguous channels of A block spectrum on which railroads could

¹ *Review of the Commission’s Rules Governing the 896-901/935-940 MHz Band*, Notice of Proposed Rulemaking, WT Docket No. 17-200, FCC 19-18 (rel. Mar. 14, 2019) (“*NPRM*”).

² *Id.* ¶ 9.

provide new wideband safety applications; (3) maintain AAR's nationwide ribbon license, which provides railroads with much-needed flexibility to efficiently install thousands of radios alongside railroad track; and (4) impose railroads' high relocation costs on the railroads themselves, which would serve as an investment in new wideband safety applications. By efficiently clearing the proposed broadband segment of railroads' nationwide safety operations and creating an opportunity for railroads to invest in wideband safety operations, the swap would serve the public interest.

I. BACKGROUND

AAR is a voluntary non-profit membership organization whose freight railroad members operate 82 percent of the line-haul mileage, employ 95 percent of the workers, and account for 97 percent of the freight revenues of all railroads in the United States.³ AAR's members also include certain passenger railroads that operate intercity passenger trains and provide commuter rail service.

Radio communications systems are a vital component of the railroad industry's operations, and much of the radio use by the rail industry is for mission-critical, safety-of-life purposes. AAR holds a nationwide "ribbon" license in the 900 MHz band (*i.e.*, 896-901/935-940 MHz), which covers the geography within 70 miles on either side of the nation's freight railway tracks.⁴ AAR's member railroads use the ribbon license's six noncontiguous, paired frequencies⁵ for Train Control / Central Traffic Control operations, enabling the wireless control of wayside track switches and signals. Currently, AAR's member railroads use the ribbon license to operate

³ Additional information on AAR is available at <https://www.aar.org/>.

⁴ See FCC Call Sign WPSF894; *Petition of Association of American Railroads (AAR) for Modification of Licenses for Use in Advanced Train Control Systems and Positive Train Control Systems*, Order, 16 FCC Rcd 3078, ¶¶ 6, 9 (WTB 2001) ("2001 Modification Order").

⁵ The six frequency pairs are: (1) 896.8875/935.8875 MHz, (2) 896.9375/935.9375 MHz, (3) 896.9875/935.9875 MHz, (4) 897.8875/936.8875 MHz, (5) 897.9375/936.9375 MHz, and (6) 897.9875/936.9875 MHz. See NPRM n. 44; 2001 Modification Order n. 2.

approximately 9,500 transceivers all across the country for this critical train traffic control system.

These frequencies have been licensed to AAR since 1988.⁶ Three of these paired frequencies are within the Commission's proposed broadband segment (*i.e.*, 897.5-900.5 MHz/936.5-939.5 MHz); the remaining three paired frequencies are less than one megahertz away from the proposed broadband segment.⁷

II. THE NPRM'S PROPOSALS WOULD INTRODUCE UNNECESSARY, COMPLEX ADMINISTRATIVE BURDENS

A. The NPRM's apparent proposal to return the AAR frequencies to site-based licensing would be inconsistent with the Commission's finding in the *2001 Modification Order*.

The NPRM limits its discussion of railroad operations to one sentence and one footnote⁸ and proposes that, in the markets transitioned to broadband use, "the 896-897.5/935-936.5 MHz and 900.5-901/939.5-940 MHz band . . . be designated as the narrowband segment *available for site-based operations*."⁹ Based on its reference to site-based operations, the NPRM does not appear to consider relocating AAR's nationwide 900 MHz band operations into the proposed narrowband segment as a *single* license. Since AAR's member railroads operate approximately 9,500 wayside stations nationwide, the NPRM therefore appears to suggest that AAR's current nationwide ribbon license could be broken up into possibly thousands of individual site-based licenses.

Breaking up AAR's nationwide license into potentially thousands of site-based licenses – with varying frequencies for each license – will introduce unnecessary administrative burdens on AAR and the Commission. In the *2001 Modification Order*, the Commission created the

⁶ See *2001 Modification Order* ¶ 3. The frequencies were converted into a single ribbon license in 2001. See *id.*

⁷ *NPRM* ¶ 15 (proposing 897.5-900.5 MHz/936.5-939.5 MHz as the broadband segment).

⁸ See *id.* ¶ 16, n. 44.

⁹ *Id.* ¶ 19 (emphasis added).

nationwide ribbon license precisely to avoid these administrative burdens, agreeing with AAR and the Federal Railroad Administration that a nationwide license would “enhance administrative efficiency for both the Commission and AAR” and “result in improvements to the safety of train operations in general.”¹⁰ Compared to the many site-based licenses under which AAR’s railroad members had previously been operating, the Commission determined that the increased flexibility inherent in a geographic area license would facilitate the deployment of wireless facilities to support railroad safety.¹¹ The Commission therefore found that “such a streamlining [was] in the public interest.”¹² The NPRM presents no rationale for reversing the Commission’s prior finding.

B. Although the details of AAR’s proposed relocation are unclear, a county-by-county approach would be both administratively and operationally burdensome.

The NPRM also does not appear to contemplate how AAR’s unique ribbon license would be relocated. For example, the NPRM proposes giving only “site-based incumbents” the opportunity to relocate on a voluntary basis.¹³ Furthermore, the NPRM states that broadband licensees must either clear or protect “covered incumbents” but defines “covered incumbents” to cover only site-based licensees.¹⁴ In the NPRM’s incentive auction proposal, vouchers would only be offered to major trading area (“MTA”) SMR licensees and, if necessary, to site-based licensees.¹⁵ Since AAR’s nationwide ribbon license is neither site-based nor geographically based on MTAs, none of these processes appears applicable to AAR.¹⁶

¹⁰ *2001 Modification Order* ¶ 7.

¹¹ *Id.*

¹² *Id.*

¹³ *NPRM* ¶ 27.

¹⁴ *Id.* ¶ 32.

¹⁵ *Id.* ¶¶ 48-49.

¹⁶ While the NPRM references a potential exception to mandatory relocation for “complex systems,” the NPRM’s discussion of complex systems is brief and ambiguous. *See id.* ¶ 38 (“[T]he FCC could require mandatory relocation for [incumbent holdouts] except for those with

However, it is clear that the NPRM proposes to issue broadband licenses on a county-by-county basis. Such a patchwork approach would be an administrative nightmare for a nationwide licensee like AAR, with its spectrum being relocated by different entities to different frequencies in different counties, possibly with different schedules and reimbursement mechanisms. New staff may need to be hired just to manage this process across hundreds or even thousands of counties in the U.S. where a broadband licensee emerges.

In addition to the obvious administrative burdens, assigning different frequencies to AAR in different counties would create operational issues. A given trackside switch or signal operates on a single frequency, but is typically covered by two or more different base stations for redundancy. If these base stations are located in different counties and are assigned different frequencies, the redundancy would be lost. If the primary base station goes down or experiences interference, the traffic control center would lose control of the switch or signal, thus halting train movement. This could result in trains being stopped in extremely undesirable locations, such as being stretched across cities and towns, blocking highway grade crossings. This would create public inconvenience and potentially serious consequences for the delivery of emergency services. Thus, for both administrative and operational reasons, the Commission should ensure that any relocation of AAR's frequencies is accomplished through a global, nationwide solution.

III. AAR'S RELOCATION COSTS COULD BE PROHIBITIVELY EXPENSIVE AND SUCH A TRANSITION COULD REQUIRE UP TO FIVE YEARS TO COMPLETE

The NPRM seeks comment on the relocation costs for 900 MHz band incumbents and notes that such costs "may be relatively low given that equipment is interoperable across the entire band and would therefore only require incumbents to retune their existing radio

complex systems, which could be defined as systems with 65 or more integrated 900 MHz sites.""). While railroads' networks would clearly qualify as "complex systems," it does not seem that this designation would ultimately protect AAR from mandatory relocation if an auction process is used.

equipment.”¹⁷ This supposition is incorrect with regard to the railroads’ equipment. After conducting a survey of member railroads, AAR has determined that approximately one-third of the roughly 9,500 radios operating on the spectrum are incapable of being retuned. These older radios were custom designed to operate only on the six channel pairs currently assigned to AAR. These radios would therefore need to be completely replaced with new radios in any relocation. For the newer radios that can be retuned, it is railroad practice to physically swap out the radio to perform the retuning offsite. This both minimizes rail traffic disruption and allows the retuning to be performed in the controlled environment of a radio shop, which facilitates proper calibration. Thus, regardless of whether a radio can be retuned or must be replaced, a physical swap out will be required. Because many of the radios are located in remote areas, it can take hours of travel time just to reach the site, in addition to the time need to exchange the radio.

With these considerations in mind, AAR has estimated that replacing or retuning 9,500 radios would cost nearly \$70 million, if all six channels were relocated. Relocating only three channels would reduce the cost by approximately one-half. These costs include those associated with channel planning and design, purchase of new equipment or recalibration of existing equipment, and labor expenses (*e.g.*, removal, installation, travel). Therefore, the relocation costs would be, contrary to the NPRM’s assumption, relatively substantial.¹⁸ These higher than expected clearing costs could make the 3+3 broadband licenses less attractive to potential licensees.¹⁹

¹⁷ *Id.* ¶ 50.

¹⁸ Costs associated with replacing or retuning radios would be incurred regardless of whether AAR’s relocation is mandatory or occurs as part of the proposed voluntary swap arrangement with PDV. As explained further in Section V, under the proposed arrangement with PDV the railroads would bear the full cost of relocation, treating it as an investment in the new capabilities that a wideband channel would offer.

¹⁹ Of course, as discussed above, AAR requires a nationwide solution to its relocation as opposed to a county-by-county approach. It remains to be determined how a potential broadband licensee interested in only a few counties would be required to contribute its share of AAR’s relocation costs.

Finally, the same factors that make an AAR transition expensive will also make it lengthy in duration. Once new frequencies are assigned, AAR member railroads will need up to five years to complete the transition given the large number of staff hours that will be required to accomplish such a major undertaking.

IV. NEXT GENERATION WIDEBAND APPLICATIONS COULD ENHANCE RAIL SAFETY

The railroads are currently unable to deploy important new train safety applications with AAR's current inventory (in multiple bands) of only narrowband spectrum. For this reason, in its NOI comments, AAR advocated for reconfiguring the 900 MHz band in a way that would allow for wideband operations for functions that do not necessarily need broadband connections for their next generation applications.²⁰ As discussed *infra* in Section V, the proposed reconfiguration of the 900 MHz band presents a unique opportunity for AAR to convert its non-contiguous narrowband channels into a single 125 kHz wideband channel. Such a wideband channel could be used for a number of rail safety enhancements, including those that would be used to satisfy requirements of the Federal Railroad Administration ("FRA"):

- *PTC Reliability.* In their PTC Safety Plans approved by the FRA, the railroads have committed to a 99.999% ("five nines") availability for their PTC networks.²¹ In order to achieve this, railroads rely on redundant paths for PTC base station backhaul. Thus, railroads rely on a variety of communications technologies, including cellular service, satellite service and landline facilities. However, in remote areas and difficult terrain, more than one of these options is very often not available. Thus, a 900 MHz wideband channel could provide that important second path to maintain network reliability.

Separately, a 900 MHz wideband channel could be used to perform remote diagnostics and corrections on the tens of thousands of PTC wayside interface units (WIUs) that provide for the interchange of data between the critical wayside infrastructure components and the PTC clients/server. This is not possible using the narrowband 220 MHz PTC network.

²⁰ Comments of the Association of American Railroads, WT Docket No. 17-200, at 1-2 (Oct. 2, 2017).

²¹ See also 49 C.F.R. §§ 236.1001 *et seq.* ("Positive Train Control Systems").

- *Highway Grade Crossing Continuous Integrity Testing.* The FRA requires testing of highway grade crossing equipment once every month.²² With a 900 MHz wideband channel, the railroads could exceed this requirement with continuous monitoring of this equipment, which could detect malfunctions weeks sooner.²³ Moreover, resets and other diagnostics could be performed remotely rather than waiting for a crew to reach the site. Given that most railroad accidents occur at grade crossings, properly functioning protection is a critical safety mechanism.
- *Advanced Defect Detection.* Technologies such as thermal imaging can allow railroads to detect train wheel defects and overheated gear boxes earlier and prevent derailments and fires. Other wayside detectors look for objects dragging the tracks and for anomalies in rail car height/width that could pose problems to tunnels and bridges. Adding defect sensors on individual rail cars would prevent damage and derailments. Operating and properly maintaining these sophisticated monitoring devices require increased wide-band connectivity compared to what is in place today
- *Increased Oversight of Maintenance Activities.* Railroads use evolving systems to increase coordination and communications between the track maintenance and train operations personnel to avoid accidental collisions. In many rural areas, cellular service is not available for this purpose.

There are no commercially available wideband or broadband service alternatives suitable for the full extent of the railroads' proposed next generation operations. Railroads are already large consumers of cellular service. For example, nearly all PTC equipped locomotives, some 15,000-plus units, are equipped with cellular modems, as are tens of thousands of wayside sites. However, cellular service is not sufficiently reliable for Traffic Control or to meet the railroads' FRA obligations of achieving 99.999% reliability for PTC. Therefore, it is generally used in conjunction with another communications path. In addition, commercial carriers do not offer geographically ubiquitous service. FCC service rules do not require build-out over anything close to 100% of licensee's land area, so sparsely populated, remote areas – including those traversed by railroads – often lack coverage. Over the past several years, AAR member railroads

²² See, e.g., 49 C.F.R. §§ 234.249 (“Ground Tests”), 234.251 (“Standby Power”), and 234.255 (“Gate Arm and Gate Mechanism”).

²³ Currently, an equipment malfunction that occurs the day after an on-site inspection may not be identified and corrected until the next physical inspection a month later.

have contacted commercial carriers about the possibility of expanding their footprints to cover railroad track. Understandably, however, the carriers need more than a railroad as a customer in an area to justify the build-out investment. Commercial options are also ill-suited for mission-critical communications links because railroads have no control over planned outages, such as for base station maintenance. In the experience of AAR members, carriers will not provide the railroads with advance notice of outages, much less coordinate their outage schedule with the railroads' schedules to avoid traffic disruptions.

AAR expects that the same issues will be present with the new 900 MHz broadband licensees. Indeed, given the county-based licensing approach, it is already contemplated that many counties may not have a broadband licensee.²⁴ Thus, railroads need a wideband network that they construct and control to ensure availability and reliability, when and where they need it.

V. A SPECTRUM SWAP WITH PDV WOULD RELOCATE AND MAINTAIN THE NATIONWIDE RIBBON LICENSE WHILE ENABLING WIDEBAND RAIL SAFETY APPLICATIONS

A. AAR and PDV have negotiated a relocation solution.

PDV and the Enterprise Wireless Alliance (“EWA”) have explained in previous comments that, given AAR’s unique license and extensive nationwide operations, AAR’s operations would need to be accommodated in any reconfigured 900 MHz band plan.²⁵ Recognizing this, PDV engaged with AAR early on and the parties have negotiated a Letter of Intent for a spectrum swap that would relocate AAR nationwide in an acceptable manner. Under the proposed swap, AAR would exchange its six non-contiguous channels for 10 contiguous channels (*i.e.*, usable as a 125 kHz wideband channel) in the A Block and AAR would be fully

²⁴ See *NPRM* ¶ 53 (discussing “counties where there [is] no demand for the broadband license”).

²⁵ Further Comments of Enterprise Wireless Alliance and pdvWireless, Inc., WT Docket No. 17-200, at 17 (May 1, 2018).

responsible for its estimated \$70 million in relocation costs.²⁶ AAR and its member railroads view the relocation costs as an investment to provide wideband capabilities for the railroad safety applications described in Section IV above.

Given the unique nationwide status of AAR in the band, it would be advantageous to all parties involved – including potential broadband licensees other than PDV – to have AAR relocated outside of the transition scenarios proposed in the NPRM. Otherwise, the reimbursement of relocation costs could render the creation of broadband licenses uneconomical. The railroads – which did not ask for this band reconfiguration – certainly cannot be expected to spend tens of millions of dollars simply to return to a *status quo* position, with zero increase in functionality or utility. Furthermore, the railroads’ nationwide footprint and 9,500 active sites render impractical the operation of a broadband overlay network, which was one option discussed in the NPRM.²⁷ For the purpose of implementing new safety applications, AAR and its member railroads are willing to absorb full relocation costs if they can obtain the 900 MHz A Block with the same geographic coverage as AAR’s current license. Given the public safety benefits that would accrue as a result, the spectrum swap would serve the public interest.

B. The NPRM’s proposals would stymie the AAR/PDV solution.

As currently written, the NPRM’s proposals would stymie the proposed AAR and PDV swap arrangement. First, assigning the A Block to AAR *before* adoption of the proposed rules would make PDV ineligible for broadband licenses nationwide because PDV could not meet the proposed requirement that a broadband license applicant hold all 20 geographically licensed blocks.²⁸ Second, assigning the A Block to AAR *after* adoption of the rules would violate the NPRM’s proposal to limit relocated incumbents to the same number of channels they previously

²⁶ AAR notes that in order to maintain consistent frequencies nationwide, the relocation spectrum will need to come from MTA licenses (such as the A Block), as there is no set of B/ILT frequencies that are incumbent-free nationwide.

²⁷ See NPRM ¶ 41.

²⁸ See *id.* ¶ 29.

held.²⁹ Again, the unusual nature of AAR's nationwide license and the public interest in rail safety justifies exempting the AAR relocation from the proposed limitations and allowing the swap to proceed.

Finally, to accomplish the swap, an exchange of spectrum between PDV and the FCC will be needed. PDV either holds or is completing transactions to hold all of the A Block spectrum in the continental United States, except for three A Block licenses that are in the FCC inventory.³⁰ PDV has proposed obtaining these three licenses by swapping its C Block spectrum for the FCC's A Block spectrum. The A Block spectrum could then be assigned to AAR as a nationwide ribbon license in exchange for AAR relinquishing its current nationwide ribbon license, which would ultimately become available for relocating other incumbents.

²⁹ See *id.* ¶ 36 (“[T]he spectrum the prospective broadband licensee offers for the purposes of relocation may not exceed the incumbent’s current spectrum holdings.”).

³⁰ The licenses are for: (1) Charlotte (MTA006); (2) Dallas (MTA007); and (3) Birmingham (MTA029).

VI. CONCLUSION

The vast geographic scope of AAR's ribbon license and the extent of current railroad operations mean that it would be impractical in all but a relative handful of counties to offer a broadband service while simultaneously protecting AAR. Thus, AAR will need to be relocated. However, relocating the frequencies associated with AAR's nationwide ribbon license on a county-by-county basis would introduce unnecessary, complex administrative and operational burdens for AAR, as well as for prospective broadband licensees and the Commission. Therefore, AAR's nationwide ribbon license should be maintained in any relocation. The simplest solution would be to enable AAR and PDV to proceed with their proposed spectrum swap, which will also serve the public interest by enabling new wideband applications to improve railroad safety.

Kathryn D. Kirmayer
Senior Vice President – Law & General Counsel

Timothy J. Strafford
Associate General Counsel

THE ASSOCIATION OF AMERICAN RAILROADS
425 Third Street, SW, Suite 1000
Washington, DC 20024

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Respectfully Submitted,

/s/ Michele C. Farquhar
Michele C. Farquhar
David Martin
Tom Peters
John Castle

HOGAN LOVELLS US LLP
555 Thirteenth Street, NW
Washington, DC 20004
T: (202) 637-5663